

## THREE NEW AMERICAN *APHODIUS* WITH NOTES AND A KEY TO RELATED SPECIES (SCARABAEIDAE)

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The beetles treated in the following notes are closely allied to *Aphodius crassulus* Horn. They are found from New Jersey to Arizona and Temascaltepec, in the state of Mexico. All are comparatively rather small, shining, usually pitchy black species of strongly convex habitus. One new species, because of its quadridentate clypeus, would fall in Horn's group A; all others have the clypeus bidentate or at least strongly biangulate and would be placed in a subdivision of group B (Horn, 1887, p. 8). Many of them apparently are attracted only to deer droppings in shady, wooded areas.

Group characters, aside from the dentate clypeus, compact convex form, and shiny black appearance, are as follows: scutellum small; posterior tibiae apically fimbriate with equal spinules; anterior tibiae tridentate, crenulate above the teeth, anterior face smooth; first segment of anterior tarsi shorter than the second; head more or less trituberculate, clypeus almost always with few to many, small, rounded tubercles at sides and anterior edge, often masked by punctate-rugose sculpture.

### Key to species

1. Clypeus with two triangular teeth or angulations ..... 2  
Clypeus with four equal, spiniform, slightly recurved teeth; Texas ..... **bottimeri**,  
new species.
2. Elytral intervals concave, especially at shoulders; New Jersey ..... **odocoilis** Robinson  
Elytral intervals flat or convex ..... 3
3. Terminal abdominal segment with a distinct concavity; mountains of North and South  
Carolina ..... **brimleyi** Cartwright  
Terminal abdominal segment without concavity ..... 4
4. Elytral striae noticeably wider over apical declivity with the intervals becoming very  
strongly convex ..... 5  
Elytral striae not noticeably wider over apical declivity and the intervals not strongly  
convex at apex ..... 6
5. Elytral intervals flat on disc, striae coarse and punctures crenating edges of intervals;  
larger species, 3.6 to 6.0 mm.; Virginia to Florida ..... **crassulus** Horn  
Elytral intervals usually slightly to moderately convex on disc, the striae finer and the  
punctures not noticeably crenating edges of intervals; small species, 3.3 to 3.7 mm.;  
México ..... **spiniclypeus** Hinton
6. Clypeus not punctate-rugose but with small, rounded, well-separated tubercles, other-  
wise relatively smooth; pronotal punctures fine, separated by at least the diameter  
of the coarse punctures even in the anterior angles ..... 7  
Clypeus strongly rugose-punctate; pronotal punctures usually closer and not as fine  
..... 8

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7. Basal tooth of anterior tibia slightly nearer base than apex; antennae light colored; strial punctures and crenations of intervals of elytra not or scarcely evident over apical declivity; first four striae subparallel, only slightly converging at apex; South Carolina ----- **windsori** Cartwright  
 Basal tooth of anterior tibia nearer apex than base; antennae fuscous; strial punctures of elytra very slightly larger and more noticeable over declivity than on disc; South Carolina to Texas ----- **lodingi**, new species
8. Elytra relatively short, four-fifths as wide as long; pronotal punctures relatively coarse, dense at sides and in anterior angles where they are separated by less than the diameter of the fine punctures, often some merging together; Texas ----- **abusus** Fall  
 Elytra longer, three-fourths as wide as long; pronotal punctures more widely separated in anterior angles ----- 9
9. Apex of elytra shining, not alutaceous; pronotum with mixed punctures, some three or four times as large as adjacent fine punctures, this disparity more noticeable laterally; Texas, New Mexico, Arizona ----- **crassuloides** Fall  
 Apex of elytra always alutaceous; punctures of pronotum almost uniform in size, evenly, closely spaced throughout; Oklahoma ----- **pseudabusus**, new species

### **Aphodius bottimeri**, new species

Holotype. — Length 4 mm., width 2 mm. Oblong, convex, piceous, shining. Head strongly convex, without frontal tubercles, surface behind frontal suture with close, moderately coarse punctures separated by less than one to two diameters, middle third anterior to suture closely, moderately, coarsely punctate to roughly rugose, anterior third similarly rugose with numerous low, rounded tubercles added; anterior clypeal margin broadly, weakly emarginate and bearing four very distinct, equal, slightly recurved, spiniform teeth, each tooth at least twice as long as its basal width, the middle teeth separated by twice the distance to those on either side; lateral edge of clypeus narrowly reflexed, nearly straight to the slightly depressed obtusely right-angled genae. Palpi and basal joints of antennae castaneus, club of antennae grayish-brown. Pronotum three-tenths wider than long, sides straight, not quite parallel, two-sevenths shorter than middle line, anterior angles rounded, posterior angles distinct but obtuse, base and sides finely margined, surface closely, evenly punctate throughout, fine to moderate punctures of disc separated by one to two diameters, a little closer at sides and tending more noticeably to two sizes. Elytra about three-quarters as wide as long, sides nearly parallel, diverging to slightly beyond the middle, striae strong and deep, crenately not closely punctate, the striae becoming wider over apical declivity, intervals very weakly convex, finely, distinctly, biserially punctate. Mesosternum finely alutaceous, close, shallow, coarse punctures except at middle, a row of four or five punctures extending back nearly the full length of the carina between the middle coxae. Metasternum shining, scattered, moderate punctures separated by about two diameters over disc, median line weakly impressed. Posterior coxal plates strongly alutaceous. Abdominal segments alutaceous, each with a transverse row of four or five hair-bearing punctures at each side. Anterior tibiae strongly tridentate, crenate above the teeth, spur strong, acuminate, arcuate downward, first tarsal segment shorter than the second. Middle and hind femora with scattered, moderately close punctures. Posterior tibiae with fringe of short equal spinules, long spur, first tarsal segment, and the following three together approximately equal in length. Sex not determined.

Holotype, USNM No. 63579. collected at Camp Stanley, Texas, 22 March 1947, by L. J. Bottimer in whose honor the species is named.

Forty-five paratypes, all collected in Texas by L. J. Bottimer, all taken at deer droppings except one in cow dung, as follows: 9, Camp Stanley, March 22, 1947;

3, Camp Stanley, March 7, 1951; 23, Camp Stanley, March 16, 1953; 2, Camp Stanley, February 25, 1955; 4, Kerrville, 3-17-48, 1-20-49, 2-6-49, and March 1951; 1, Fredericksburg, October 22, 1950; 3, Rock Springs, April 18, 1950.

There is little variation among the specimens. In size the largest is 2.2 mm., and the smallest is 2.0 mm., in length. In two or three specimens the small rounded tubercles of the clypeus are more noticeable because the surface is less wrinkled otherwise.

None of the specimens shows distinct frontal tubercles but a few have a small smooth spot where the median tubercle would be expected if present. Whether or not there is a carina between the middle coxae is uncertain, some specimens showing a distinct carina more or less masked by coarse punctures, others showing none whatever. Because of these more or less uncertain characters it is not easy to place the species in Horn's 1887 key to the Aphodiini of the United States; however, the size, shape, color, and general appearance place it near *A. crassulus* Horn and allied species. The four sharp, prominent clypeal teeth easily distinguish the species. In occasional specimens of *A. conspersus* Horn from California, the head is superficially very similar to that of *bottimeri* but *conspersus* has a distinct clypeal carina and lacks the small rounded tubercles anteriorly. *A. conspersus* is also a flatter, relatively longer species, usually with small round pale spots on the elytra. In *quadridentatus* Harold, described from Cuba, the middle teeth are larger, sharper, and project forward while the sides of the pronotum, apices of the elytra, and elytral spots are reddish yellow.

Paratypes will be placed in the collections of the American Museum of Natural History, the British Museum (Natural History), Canadian Department of Agriculture, California Academy of Sciences, Chicago Natural History Museum, Museum of Comparative Zoology, Naturhistoriska Riksmuseum, and the private collections of L. J. Bottimer, Henry Howden, and Mark Robinson.

### ***Aphodius odocoilis* Robinson**

*Aphodius odocoilis* Robinson, Ent. News, 50, p. 24, 1939.

Mark Robinson described this species from New Jersey, stating that it had been taken only in deer and rabbit excrement. In the present study I have examined five specimens from Mt. Misery, the type locality, and Clementon, New Jersey. It is one of the smallest species in the group, ranging from 2.7 to 3.7 mm. in length. The type is in the Robinson collection in Philadelphia, Pennsylvania.

**Aphodius brimleyi** Cartwright

*Aphodius brimleyi* Cartwright, Ann. Ent. Soc. America, 32 p. 357, 1939.

This species is found in the mountains of North and South Carolina in deer droppings. The 26 specimens examined were collected from May 25 to August 26 in Pisgah Forest near Brevard, North Carolina, and on Sassafras Mountain above Rocky Bottom, South Carolina. The concavity of the terminal abdominal segment is unique. The type is in the United States National Museum.

**Aphodius crassulus** Horn

*Aphodius crassulus* Horn, Trans. American Ent. Soc., 3, p. 118, 1870.

*Aphodius crassulus*, the first known and largest species of the group was described from Georgia and Florida. Forty-four specimens bear the following locality labels: Okefenokee Swamp, Georgia; Seabrooks Island, and Caspary Plantation near Ritter, South Carolina; and Deep Creek, Norfolk County, Virginia. C. S. Brimley listed *Aphodius crassulus* Horn from Cape Hatteras, in his Insects of North Carolina, 1938. The South Carolina and Virginia specimens were collected at deer droppings in shady woods. The specimens range from 3.5 to 6.0 mm. in length. Dr. Horn's specimens are in the Academy of Natural Sciences of Philadelphia.

**Aphodius spiniclypeus** Hinton

*Aphodius spiniclypeus* Hinton, Stylops, 3, p. 190, 1934.

This small Mexican species was described from Real de Arriba, District of Temascaltepec, State of México, from specimens collected at an elevation of 6000 feet. Eight specimens in the United States National Museum were studied, 3 paratypes, and 5 from the Casey collection labelled simply, México, D. F. The type is reported to be in the California Academy of Sciences.

**Aphodius windsori** Cartwright

*Aphodius windsori* Cartwright, Ann. Ent. Soc. America, 32, p. 357, 1939.

The holotype and single paratype remain the only specimens of this species known to the writer. They were taken under horse or mule dung in a sandy long-leaf pine woods near Windsor, South Carolina. A number of characters set *windsori* apart from others of the group found in the same general area: the light-colored antennae, the weakly rounded genae, the anterior tibial teeth far apart with the upper tooth very slightly nearer the base than to the tip of the apical tooth, the elytral

striae with punctures and crenations scarcely evident over the apical declivity, the first four striae subparallel, converging only slightly and all reaching the apical edge, the small size, and the redder color. The holotype is in the United States National Museum.

### ***Aphodius lodingi*, new species**

Holotype male.—Length 4.2 mm., width 2.2 mm. Oblong-oval, convex, piceous, shining. Head convex, trituberculate along frontal suture, punctures behind suture moderate in size, slightly larger than those on pronotal disc, separated by about their diameters; clypeus sharply bidentate, the upturned teeth rather widely separated, the distance between them greater than from tooth to genal suture, broadly shallowly emarginate between the teeth, sides weakly arcuate to genae, surface with very distinct, rounded tubercles separated by one to two times their diameters over anterior two-thirds, scattered fine punctures posteriorly to frontal suture, genae sharply rounded, greater than a right-angle. Club of antennae grayish fuscous. Pronotum strongly convex, 1.95 mm. long by 1.4 mm. wide, sides weakly arcuate, nearly straight posteriorly, all angles obtuse and rounded, sides and base finely margined; punctures fine, quite uniformly distributed, a little closer anteriorly at sides, a few slightly coarser punctures intermixed, separated by about two diameters on disc. Elytra short, 2.2 mm. in width by 2.5 mm. in length, strongly convex, sides nearly straight over basal half, striae moderately deep, the strong punctures crenating the sides of the intervals even at apex, intervals nearly flat with scattered very fine punctures. Mesosternum closely, rather coarsely, setigerously punctate. Metasternum with scattered fine punctures, coarse setigerous punctures anteriorly at sides. Posterior coxal plates alutaceous. Abdominal segments alutaceous, with transverse rows of very shallow, coarse, setigerous punctures, the hairs of each anterior row about as long as the length of the segment. Anterior tibia smooth in front, the basal tooth slightly nearer apex than base, crenate above the teeth, second tarsal segment longer than the first, spur moderately heavy, its tip slightly bent downward. Middle and hind femora shining, sparsely punctate. Posterior tibiae fimbriate with short almost equal spinules, first tarsal segment subequal to long spur, and to the following three segments combined.

Holotype, USNM No. 63580, collected at deer droppings, Caspary Plantation, near Ritter, South Carolina, November 30, 1939, by W. M. Upholt.

Thirty paratypes: 15, collected with holotype by O. L. Cartwright and W. M. Upholt; 1, Savannah, Georgia, Hubbard and Schwarz; 1, Lafayette, Louisiana, B. R. Coad; 1, Fort Deposit, Alabama, February 2, 1938, J. G. Watts; 11, Mobile, Alabama; 1, Texas, Hubbard and Schwarz. They range from 3.6 to 4.7 mm. in length.

*Aphodius lodingi*, named after Henry P. Löding who collected and studied the Gulf Coast fauna for many years, is very close to *Aphodius windsori*. It differs in having the third or basal tooth of the anterior tibia nearer the apex than the base, the antennae darker, the tubercles of the clypeus more distinct, the elytral striae distinctly crenate-punctate apically, and in being relatively shorter and more convex.

### **Aphodius abusus** Fall

*Aphodius abusus* Fall, Trans. American Ent. Soc. 33, p. 242, 1907.

*Aphodius abusus* Fall was described from Texas. It is very close to *crassuloides* but on direct comparison is found to be shorter and more convex. The pronotal punctures are very close and especially dense in the anterior angles; the elytra are noticeably shorter, more convex in profile, with deeper striae, the strial punctures scarcely crenating the very flat intervals. It is rare in collections. I have seen only five specimens including the holotype. One of the two specimens from Winnfield, Louisiana, in the Fall collection labeled *abusus* is correctly determined, the other is the species described as *lodingi* in this paper. There were three in the Liebeck collection simply labeled "Texas." One of these is now in the National Museum collection.

The type of *abusus* is in the H. C. Fall collection in the Museum of Comparative Zoology at Harvard College, Cambridge, Massachusetts.

### **Aphodius crassuloides** Fall

*Aphodius crassuloides* Fall, Trans. American Ent. Soc., 33, p. 243, 1907.

Dr. H. C. Fall described *Aphodius crassuloides* from Cludcroft, New Mexico, comparing it with *abusus*, *ruricola*, and *granarius*. The latter two are superficially quite similar in general appearance, *ruricola* particularly so, but they never show the distinct clypeal teeth so evident in the species here discussed. *Aphodius crassuloides* is perhaps most closely related to *pseudabusus* n. sp., however, it practically never shows more than a faint trace of alutaceous sculpture at the tips of the elytra, a type of surface sculpture always noticeable in *pseudabusus*. The pronotal punctures are more nearly of one size in the latter species also, whereas there is very often considerable disparity in *crassuloides*, especially at the sides. Over one hundred specimens of *crassuloides* have been examined from the following localities: Kerrville, Texas and "Texas" (Belfrage); Cludcroft and Las Vegas, New Mexico; and Flagstaff, Fort Grant, Chiricahua Mts., Palmerlee, Huachuca Mts. Madera Canyon, Santa Rita Mts., Patagonia Mts., and Southwestern Research Station, 5 miles west of Portal, Arizona.

The type of *crassuloides* is in the Fall collection at the Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts.

### **Aphodius pseudabusus**, new species

Holotype male.—Length 4.1 mm., width 1.95 mm. Oblong, convex, piceous, shining. Head not strongly convex, frontal tubercles weak but evident, surface with moderate punctures throughout, separated at middle on each side of frontal suture by one to

two times their diameter, a little closer laterally, anterior third roughly rugose-punctate but without rounded tubercles; anterior clypeal margin broadly emarginate, bordered each side by a small sharp tooth or angulation, sides weakly arcuate to moderate, rounded genae. Club of antennae grayish brown. Pronotum strongly convex, 1.8 mm. long by 1.3 mm. wide, sides weakly arcuate, anterior angles rounded, posterior angles distinct but obtuse, base and sides finely margined, surface uniformly, moderately punctate throughout, the punctures separated on the disc by one to two diameters, only very slightly closer laterally and in the anterior angles. Elytra one-fifth longer than wide, sides nearly parallel, striae strong and deep, the strial punctures weakly crenating the sides of the intervals, intervals shining, slightly convex, with marginal rows of fine punctures separated by three or four times their diameters, these punctures very slightly coarser or more noticeable over the apical declivity, apex of elytra distinctly alutaceous. Mesosternum with close, shallow, alutaceous punctures, each puncture bearing a very fine decumbent hair. Metasternum weakly concave at middle and finely punctate, the punctures separated by approximately three times their diameters, a few scattered punctures outward to sides. Posterior coxal plates finely alutaceous. Abdominal segments and pygidium finely alutaceous, very finely punctate, and clothed with extremely fine hairs. Anterior tibiae strongly tridentate, crenate above the teeth, spur strong, acuminate, arcuate downward, first tarsal segment much shorter than the second. Middle and hind femora shining, with scattered moderately close fine punctures. Posterior tibiae with fringe of short equal spinules, first tarsal segment subequal in length to long spur and to the three following segments combined.

Holotype, USNM No. 53581, collected in Payne County, Oklahoma, April 11, 1924 by W. J. Brown. Forty-two paratypes: 38, Payne County, Oklahoma, April 8-17, 1924, W. J. Brown; 2, Norman, Oklahoma, April 3, 1933, V. A. Smith; 1, Wessington, South Dakota, June 20, 1939, "Pothole," H. C. Severin; and 1, South Dakota, June 17, 1935, R. Cooper.

The specimens range in length from 3.6 to 4.9 mm. and in width from 1.7 to 2.6 mm. The three frontal tubercles are well developed in many specimens. A few show a slight tendency toward two sizes of punctures at the sides of the pronotum but in general the pronotal punctures are quite uniform in size and distribution. All specimens have at least a small amount of alutaceous sculpture on the tips of the elytra. Only very rarely can even a trace of alutaceous sculpture be found on the elytral apex of *crassuloides*, a very similar and closely related species. On direct comparison, the pronotum is more convex with greater disparity in the sizes of punctures and the genae usually less arcuate and prominent in *crassuloides*.

Paratypes will be placed in the collections of the British Museum (Natural History), Canadian Department of Agriculture, the University of Oklahoma, South Dakota State College, the United States National Museum, and in the private collections of L. J. Bottimer, H. F. Howden and Mark Robinson. (Many of these specimens were distributed by Dr. W. J. Brown under the name *abusus* Fall.)